

Three Papers of Dr. Martin Lyster, the first of the Nature of Earth-quakes; more particularly of the Origine of the matter of them, from the Pyrites alone.

I Have elsewhere^a shewn that the breath of the Pyrites is Sulphur *ex tota Substantia*: Also, That it naturally takes fire of it self: Again, that the material cause of Thunder and Lightning, and of Earthquakes is one and the same; viz. The Inflamable breath of the Pyrites, the difference is, that one is fired in the Air; the other, under ground: Of which last, these (I think) are sufficient Arguments: A thing burnt with Lightning smells of very Brimstone; again, the subtlety and thinness of the flame; also the manner of its burning, which is often observed to be *particulatim* or in small spots, vapour like. And of Earthquakes, the Sulphureous stink of waters smelt before, and of the very Air it self after them: of which innumerable instances occur in the relations of them.

They also agree in the manner of the noise, which is, to be carried on, as in a Train fired; the one rowling and rattling through the Air, taking fire, as the vapours chance to drive; as the other fired under ground in like manner moves with desultorie noise, as it shall chance to be continued.

That the Earth is more or less hollow is made probable, by what is found every where in the Mountains; viz. Natural Cavities or Chambers, which the Miners of the North call *Self-opens*. These they meet with very frequently, some vastly great, and others less, running

^aDe Fontibus Medicatis Angliae.

away with small Sinus's. And I doubt not, but upon diligent inquiry, a great Catalogue of such might be had, discovered in the Memorie of Man : Besides many there are, which are known to open to the day, and to discover themselves without digging, as Pools Hole, Oakie Hole, &c. Again, the great and small Streams, which do arise from under the Mountains do evidence the hollowness, and Sinousness of them. Add to these that many *Sinus*'s are made in that instant, and are continued by the explosion and rending of the first matter fired ; which may, and do, very probably, close again, when the force of that explosion is over ; but are sufficiently open to continue the Earthquake.

That these subterraneous cavities are at certain times and in certain seasons full of inflammable Vapours ; the Damps in our Mines sufficiently witness ; which fired, do every thing as in an Earth-quake, save in a lesser degree.^b

Now, that the Pyrites alone (which is our present Task) of all the known Minerals, yeilds this inflammable vapour, I think it highly probable, for these Reasons.

1. Because no Mineral or Ore whatsoever is Sulphureous, but as it is wholly, or in part a Pyrites : And altho this does contradict the general opinion of the Chymists ; yet they must excuse me, if I dissent from them in this particular ; for wherever any of them, shall find me Brimstone Naturally contain'd in an Ore ; there, I am very forward to beleive, I shall find them Iron also by the load-stone, so that betwixt us, we shall have discovered the Pyrites disguised in that Ore or Mineral. I have carefully made the experiment in very many of the Fossils of England, and do find them all to contain *Iron*, wherever Brimstone, as I have elsewhere declared.

2. Because there is but one Species of Brimstone, that I

^b Vid. Phil. Transf.

know of, at least with us in England : And since the Pyrites naturally and only yeilds it , it is but reasonable wherever Brimstone is found, though in the Air, or under Ground in Vapour, to think that that also proceeds from it.

If it be objected, that there is a Sulphur vive or Natural Brimstone, which is no Pyrites. I answer, that I am not willing to grant this, but do take all pure Sulphur to have been once produced by the fire . For what is found in and about the burning Mountains, is certainly the effects of Sublimation ; and those great quantities of it said to be found about the skirts of the Vulcano's is only an argument of the long duration, and Vehemencie of those fires.

If it be further objected, that the Sulphur Vive, indeed, or ruffe Brimstone, as they call it, had from Hæcla and Italie is Opaque, and agrees not with the transparent and Amber-like Sulphur Vive of the Ancients, so that the mistake is in the Druggists, that we have not right Natural Brimstone ; I reply, that grant the difference, yet it does not follow, that that also was not produced by Sublimation, no more, then that the Stalactites, or water wrought Stone, is not so made for that some of it is found Opaque and some Crystalline.

But this we will grant ; that, possibly, the Pyrites of the Vulcano's or burning Mountains may be more Sulphureous then ours. And, indeed, it is plain, that some of ours in England are very lean, and hold but little Sulphur ; others again very much.

And this may be one reason, why England is so little troubled with Earth-quakes ; and Italie and almost round the Mediterranean Sea so very much.

Another reason is ; the Paucity of Pyrites in England; where they are , indeed , some little in all places, but most'y *Sparsim*; and if perchance in *beds*, those are comparatively thinn, to what probably they are in the burning

ing Mountains, as the vast quantity of Sulphur thence sublimed doth seem reasonably to imply: Also, if we compare our Earthquakes, and our Thunder and Lightning with theirs; There it lightens almost daily, especially in Summer time, here seldome; there Thunder and Lightning is of long duration, here soon over; there the Earthquakes are frequent, long, and terrible, with many Paroxysms in a day, and that for many days; here very short, a few minutes, and Scarce perceptible. To this purpose, the Subterraneous Cavities in England are small, and few compared to the vast Vaults in those parts of the World; which is evident, from the sudden appearance of whole mountains and Islands.

If yet it shall be insisted on, that there are other inflammable Minerals besides the Pyrites; we grant there are so, but by the providence of God not to be found in England, that I know of, and not in any quantity in any place of the World, that I can learn: which is well for Mankind, because they are very Poisons, as the Orpiments; but they are all specifically distinct from Brimstone; which as we have shewn, no Ore yeilds but *Iron*; So the Orpiments are all *Gold* Ore; and for such the Emperor *Nero* (as *Pliny* testifies who was of his time and his Court) caused them to be wrought in quantity, but they would not turn to account. And, by the by, some Authors have assigned this as a good reason, against any Medicine, that shall be made out of Gold (as fond as we are of an *Aurum potabile*) as having naturally a deleterious quality. But this is besides my purpose.

The second Paper of the same person concerning the Spontaneous firing of the Pyrites.

IF it shall be objected, that no Body is kindled by it self: I answer, that it seems to me apparently otherwise,